of the restoration of the electrical equilibrium by the intervention of the frozen particles, which being imperfect conductors, become luminous while transmitting this electricity. In tropical and temperate climates this phenomenon does not occur, because the electric equilibrium is restored by means of aqueous vapours, a process which often gives rise to thunder and lightning, but never to the Aurora Borealis; the latter being peculiar to clear, cold and dry weather.

8. "Théorie Balistique." Par M. Le Comte de Prédaval. Communicated by Dr. Roget, Sec. R.S.

The author inquires into the influence which he conceives the following circumstances may have on the path of a projectile on the surface of the earth; namely, first, the direction of the line of projection relatively to the meridian or cardinal points; secondly, the latitude of the place; and thirdly, the barometric conditions of the atmosphere.

9. "On the Atmospheric Tides and Meteorology of Dukhun, in the East Indies." By Lieut.-Colonel W. H. Sykes, F.R.S.

The author premises detailed descriptions of the various instruments used in the meteorological observations recorded in this paper, and of the methods employed in obtaining his results; of which the great features are the barometrical indications of diurnal and nocturnal atmospheric tides, embracing two maxima and two minima in the twenty-four hours. The following are the chief topics noticed in the paper, and the principal facts established by these inquiries: namely, 1. The removal of the doubts entertained by Humboldt, founded on the authority of Horsburgh, of the suspension of the atmospheric tides during the monsoon in Western India; the existence of the four atmospheric tides already mentioned, and their occurrence within the same limiting hours as in America and Europe; the greatest mean diurnal oscillations in Dukhun taking place in the coldest months, and the smallest in the damp months; whilst at Madras, the smallest oscillations are in the hottest months, and in Europe it is supposed that the smallest oscillations are in the coldest months. 2. The regular diurnal and nocturnal occurrence of the tides, without a single case of interversion, whatever may be the thermometric or hydrometric indications, or the state of the weather; storms and hurricanes only modifying, but not interrupting them. 3. The anomalous fact of the mean diurnal oscillations being greater at Poona, at an elevation of 1823 feet, than at the level of the sea, in a lower latitude, at Madras. 4. The fact of the diurnal tides, at a higher elevation than Poona, being less, whilst the nocturnal tides are greater than at Poona; and the seasons apparently not affecting the limiting hours of the tides. 5. The maximum mean pressure of the atmosphere being greatest in December and January; then gradually diminishing until July and August; and subsequently increasing to the coldest months. 6. The very trifling diurnal and annual oscillations compared with those of extra-tropical climates. 7. The annual range of the thermometer being less in Dukhun

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than in Europe, but the diurnal range much greater; the maximum mean temperature occurring in April and May, and gradually declining until December and January; and the observed mean temperature of places on the continent of India being much higher than the calculated mean temperature according to Meyer's formula. 8. The mean annual dew-point being higher at half-past nine o'clock than either at sunrise or at four in the afternoon; the dew-point being highest during the monsoons, and lowest during the cold months, and varying considerably within very short distances; being, for example, remarkably contrasted in Bombay and Dukhun; and the frequent occurrence of dew quite locally and under anomalous circumstances. 9. The amount of rain in Dukhun being only 20 per cent. of that falling in Bombay, 90 or 100 miles to the westward. 10. The wind being principally from the west and east, and rarely from the opposite quarters. 11. The great abundance of electricity under certain circumstances. 12. The rare occurrence of fogs. 13. The great amount of solar radiation; and lastly, the singular opacity of the atmosphere during hot weather, giving rise occasionally to the mirage. A variety of tables containing the records of meteorological observations, with instruments, accompany the paper.

10. "On the Ova of the *Ornithorhynchus paradoxus*." By Richard Owen, Esq. Communicated by W. Clift, Esq., F.R.S.

The author, in this paper, has prosecuted more immediately and more minutely than in his former communication, the inquiry into the structure of the ovary of the Ornithorhynchus, with a view to determine its exact relations with that of the normal Mammalia, and of the oviparous Vertebrata. He has obtained from this investigation the full confirmation of the truth of the opinion he had previously formed, that lactation might coexist with a mode of generation essentially similar to that of the Viper and Salamander; and this fact has been further established by the subsequent examination which he has made of the uterine fœtus of the Kangaroo.

The author traces the regular gradation which obtains in different orders of Mammalia in which true viviparous or placental generation takes place, towards the ovo-viviparous or oviparous modes, in which the exterior covering of the ovum never becomes vascular, and shows that the Ornithorhynchus constitutes a connecting link in this chain.

Drawings illustrative of the anatomical descriptions of the parts examined by the author accompany the paper.

11. "Observations with the Horizontal and Dipping Needles, made during a Voyage from England to New South Wales." By James Dunlop, Esq. Communicated by Capt. Beaufort, R.N., F.R.S.

This paper contains a very numerous and uninterrupted series of magnetical observations, made in the circumstances stated in the title, and extending about 180 degrees in longitude and 100 degrees in latitude. The apparatus, of which a detailed description is given, was suspended from the roof of the cabin, and no alteration was made in its suspension from the beginning to the end of the voyage.